

CLASSIC OF BIOLOGY AND MEDICINE

An Account of the Experiment of *Transfusion*, Practiced upon a *Man* in *London*

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This was perform'd, Novemb. 23, 1667, upon on Mr. Arthur Coga, at Arundel-house, in the presence of many considerable and intelligent persons by the management of those two Learned Physicians and dextrous Anatomists, Dr. Richard Lower, and Dr. Edmund King, the latter of whom communicated the Relation of it, as followeth.

The Experiment of Transfusion of Blood into an *human* Vein was made by Us in this manner. Having prepared the *Carotid* Artery in a young Sheep, we inserted a Silver-Pipe into the Quills to let the Blood run through it into a Porringer, and in the space of almost a *minute*, about 12 ounces of the sheeps blood ran through the Pipe into the Porringer; which was somewhat to direct us in the quantity of Blood now to be transfus'd into the Man. Which done, when we came to prepare the Vein in the Man's Arm, the Vein seem'd too small for that Pipe, which we intended to insert into it; so that we employed another, about one third part less, at the little end. Then we made an incision in the Vein, after the method formerly publisht, *Numb. 28*; which method we observ'd without any other alteration, but in the shape of one of our Pipes; which we found more convenient for our purpose. And, having open'd the Vein in the Man's Arm, with as much ease as in the

common way of *Venae*-section, we let thence run out 6 or 7 Ounces of Blood. Then we planted our silver Pipe into the said Incision, and inserted Quills between the two Pipes already advanced in the two subjects, to convey the Arterial blood from the Sheep into the Vein of the Man. But this Blood was near a minute, before it had passed through the Pipes and Quills into the Arm; and then it ran freely into the Man's Vein for the space of 2 *minutes* at least; so that we could feel a pulse in the said Vein just beyond the end of the silver Pipe; though the Patient said, he did not feel the Blood *hot* (as we reported of the subject in the *French* Experiment) which may very well be imputed to the length of the Pipes, through which the blood passed, losing thereby so much of its heat, as to come in a temper very agreeable to Venal Blood. And as to the quantity of Blood receiv'd into the Man's Vein, we judge, there was about 9 or 10 ounces: For, allowing this Pipe was less than that, through which 12 ounces pass'd in *one* minute before, we may very well suppose, it might in 2 minutes convey as much blood into the Vein, as the other did in the Porringer in *one minute*; granting withall, that the Blood did not run so vigorously the second *minute*, as it did the first, nor the third, as the second, &c. But that the Blood did run

all the time of those two minutes we conclude from thence; *First*, because we felt a Pulse during that time. *Secondly*, because when upon the Man's saying, He thought, he had enough, we drew the Pipe out of his Vein, the Sheeps blood ran through it with a full stream; which it had not done, if there had been any stop before, in the space of those two minutes; the blood being so very apt to coagulate in the Pipes upon the least stop, especially the Pipes being so long as three Quills.

The Man *after* this operation, as well as in it, found himself very well, and hath given in his own Narrative under his own hand, enlarging more upon the benefits, he thinks, he hath received by it, than we think fit to own as yet. He urg'd us to have the Experiment repeated upon him within 3 or 4 days after this; but it was thought advisable, to put it off somewhat longer. And the next time, we hope to be more exact, especially in weighing the Emittent Animal before and after the Operation, to have a more just account of the quantity of Blood, it shall have lost.

A RELATION OF SOME TRIALS OF THE SAME OPERATION, LATELY MADE IN FRANCE.

1. M. *Denys*, Professor of the *Mathematicks* and *Natural Philosophy* at *Paris*, in a Letter of his to the *Publisher* relateth, That they had lately transmitted the Blood of four *Weathers* [castrate male sheep] into a *Horse* of 26 years old, and that this *Horse* had thence received much strength, and more than an ordinary stomach.

2. The same person was pleased to lend to the same hand a printed *Letter*, written to the Abbot *Bourdelot* by M. *Gadroys*, being an Answer to a paper of one M. *Lamy*, and confirming the Transfusion of Blood by new Experiments. In this *Answer* the Author is vindicating the *Transfusion* from Objections; where first he takes notice, That, whereas the Objector undertakes to refute the Experiments made, by simple

Ratiocinations, it ought to be considered, that the *Quodlibetical* Learning of the *Schools* is capable enough to find Arguments *for* and *against* all sorts of Opinions, but there is nothing, but *Experience*, that is able to give the Verdict and the last Decision, especially in matters of *Natural Philosophy* and *Phyick*: That a hundred years ago, there were no Arguments wanting to prove, that *Antimony* or the *Vinum Emeticum* was poison; the use of it being then forbidden by a *Decree* of the *Faculty of Physicians*; and that at this day there are no Arguments wanting, to prove the contrary, and to assert, that it is a *Purgative* of great importance, follow'd with wonderful effects, the same *Faculty* having publish'd a *Decree* the last year, by which it permits, and even ordains the use thereof. So that it ought to be said, that *Sole Experience* hath determin'd this matter, and that the Recovery of many persons, and amongst them, of the *Most Christian King*, himself, hath more conduced to convince Men of its usefulness, than all the bare *Ratiocinations*, that could be employed to defend it. And so it is with all *Remedies*, there being not one, that is not approved by some *Physician* or other, who thinks to have reason on his side, and disapprov'd at the same time by others of that Profession, who conceive to have it on theirs: Whereas *He* certainly is to be esteemed the most *Rational*, that in these matters is guided by good *Experience*. And since the *Transfusion* of *Blood* is a new thing (unknown for ought we know) to all former Ages, ingenious Men, and lovers of the Increase of the Stock, serving for the relief and conveniences of Human Life, do no more, in this particular, than propose and recommend it to generous and unprejudicate *Physicians*, to judge of its agreeableness to *Human Bodies*, and to make trials of it accordingly; themselves esteeming, that since it concerns the Health and Life of Man, it cannot be examin'd too severely; though at the same time they conceive, that 'tis unequal to stand herein to the verdict of such arrogant Men, who

from a self-conceit of knowing all things already, are very impatient at anything discover'd, which they have not thought on themselves: Those Men being the best advised and the most to be relied on, who do not precipitate their judgment, but stay for many Experiments, carefully made, to conclude themselves by. For which purpose, the Author wishes, that *Persons* in power would cause a good number of Experiments of this Invention to be made, and examine them either themselves, or give order to prudent and free spirited *Physicians* and *Chirurgeons* to do so.

Among the *Objections*, (which the Author finds to be generally grounded upon inconsiderations, mistakes, and a supposition, as if peremptory Affirmations touching the effects of this Transfusion were obtruded, whereas all is left to the success of Experiments faithfully made) there is one, directed against the *effects* of that operation, which appeared in the young Man, who (by Mr. *Denys's* Relation in his printed *Letter* to Monsieur *De Montmor*) after he had received the Arterial Blood of a Lamb, was cured of an extraordinary *Lethargy*, consequent to a violent Fever, wherein he had been let blood 20 times. And the *Objection* is, That the lively apprehension of the said young Man had of a remedy so unusual, and whereof the success could not but appear very dubious to him, and so render him exceedingly anxious, did so rouse his spirits, and put them into such motion, as to disengage them from that embarrassment, which hindered their diffusion upon which disentanglement follow'd all the other good effects that are imputed to the Transfusion.

To this Conceit the *Answerer* replies, That if the *Apprehension* could have cured this young Man, the Cure would doubtless have been effected 24 hours before the Transfusion, because he then happen'd to have a very great one, by falling down stairs; as was also observed in Mr. *Denys* his *Relation* of this Experiment. Besides, that this Patient was noted to be so far from

apprehending or fearing this Operation, that he did not so much as know, what the *Transfusion* was; but thought, the Lamb was only applied to his Arm, to suck from him his ill Blood, as he was made to believe, after an ancient and usual way.

To that *Objection*, wherein some put weight, *viz*, That there is a great difference between the *Flesh* we eat for food, and the Blood that is transmitted *immediately* into the Veins; the former undergoing a great Alteration, which the *latter* does not: Our *Author* replies, That of the three principal Digestions of the Aliment, that have been always distinguish'd by Authors, the First, which is made in the Stomach, is not considerable in comparison of the two Others, which are made of the *Chyle* and the *Blood*, in the Heart, the Liver, and generally in all the parts that receive nutrition, which he illustrates by this: That as the Concoction, which is made of the juices of the Earth in the Root and Heart of the Trunk of a Tree, does not so much serve to the production of this or that Fruit, as the last Filtration, that is made of those Juices in the small *Fibres* of the Grafts; so also all those Digestions, which are supposed to be made in the Stomach and the Heart or the Liver of Animals, do not so much serve to give the particles of the Aliment those *Figures* which they require to be converted into the substance of Man, as the *diversity of Pores*, that strain them last of all, and differ in the Bones, Flesh, Cartilages, and other parts; in which the Ancients for this reason did admit as many different Assimilating faculties. Now, *faith be*, though the new Blood, which is given in the *Transfusion*, undergoes not the *first* Concoction, made in the Stomach, yet it suffers the two others, in making many Circulations together with the *native* blood, and that therefore nothing hinders, but it may be fit to be changed into the substance of Man, without inconvenience.

The rest of the *Objections*, here alleged, seeming to be of no moment, though answer'd by our *Author*, we shall here pass

by, and, for a general answer to all, employ Experience, and the several successful Transfusions, he relates; as those of *Lambs-blood* into Dogs, which, after the space of several months from the time of the Operation, do not only live, but are very well, and some of them grown fatter than they were before; and of *Kids blood* into a little *Spaniel bitch* of 12 years of age, which, a little while after the Operation, grew vigorous and active, and even proud in less than eight days. To which, he adds a considerable Experiment, lately made upon a person, that had been for three weeks afflicted with the complicated Distempers of an Hepatick Flux, a Lientery [malabsorptive diarrhea attributed to the spleen], and a bilious Diarrhea, accompanied with a very violent Fever; and had been attended by four Physicians, who having blooded [bled], purged, and clystered [given an enema] him, as much as they thought fit, he grew at last so weak, that he was unable to stir, lost his speech and senses, and vomited all he took: whereupon they altogether despairing of and abandoning the Patient, and declaring that they did so in the presence of diverse persons of *honor*, consented to have the *Experiment of Transfusion* made upon the *Patient*, which his *Relations* had proposed, as the last *Refuge*; very unwilling to omit any thing, that might seem probable to rescue a dying Man. M. *Denys* and M. *Emmery* were besought to employ this last succours. But they, seeing the deplored state of the Sick, absolutely refused to make the trial, alleging, that the Transfusion was not a means to restore either the solid parts, or to cure a Gangrene, which was apparently in his Intestines; they should have used it sooner, and at the very time, when the great evacuations of blood were made in the Patient. But, notwithstanding all this, they were exceedingly press'd to comply with their desires, and not to let their Friend die without trying all means possible. They, being overcome by this importunity, and having secured their honor and safety, by the declaration above mentioned

of the Physicians, and by their consent to the trial of this Experiment, transfused into his Veins a small quantity of *Calves blood* in a morning; whereupon, though this Patient was already in a Lethargy, and convulsive, and had a very low and creeping pulse, yet, behold, an unexpected change happen'd to him. His pulse grew higher in an instant, and became more vigorous, his Convulsions ceased, he look'd fixedly on the Bystanders spoke pertinently, and in diverse Languages to those that spoke to him, and fell into a very quite sleep. Awakening three quarters of an hour after, he took several Broths for the rest of the day, not vomiting at all, nor having any stool, although for three days before he could take nothing at the Mouth, nor had had any intermission of his looseness since the very beginning of his sickness. Having thus remained for 24 hours, his forces began to diminish again, and his pulse to grow low, and the looseness to return. His Friends then urged a second Transfusion, which being at last performed the next morning, the Patient indeed recover'd some vigor again, but that was of a short duration. For though then also he took his broth well, without vomiting, yet he voided still by stool, and at noon he began to decline, and about 5 at night he died, without the appearance of any convulsions. His body being open'd before the Physicians, the *ileon* was found return'd into it self from the top to the bottom, and below that knot unto the anus the Bowels were all livid, gangren'd, and of an unsupportable stench. His *Pancreas* was extraordinarily hard, and so obstructed, that the *Pancreatic* juice had no liberty to diffuse itself into the Guts. His *Spleen* was very thick, and his *Liver* big, and in some places livid. The *Heart* very dry, and, as 'twere, burnt. And having found the Vein, by which the Transfusion had been made, there was, from the place of the opening of the Arm, to the Heart, almost no blood found in it, no more than in the other Veins, nor in the Ventricles of the Heart, for as much as that little, he received, had been

imbibed by his hot and dry Flesh. All which this *Author* assures, can be attested both by a dozen persons of great veracity, who were present at this dissection, and confirmed by the *Certificates* given by the

Physicians themselves to be sent to the *Parents* of the deceased Stranger, who is the very same with him, of whom a less punctual account was given, *Numb.* 28, p. 519.